Tools for Skeptical Thinking
Carl Sagan

• Wherever possible there must be independent confirmation of the "facts."

• Encourage substantive debate on the evidence by knowledgeable proponents of all points of view.

• Arguments from authority carry little weight—"authorities" have made mistakes in the past. They will do so again in the future. Perhaps a better way to say it is that in science there are no authorities; at most, there are experts.

• Spin more than one hypothesis. If there's something to be explained, think of all the different ways in which it could be explained. Then think of tests by which you might systematically disprove each of the alternatives. What survives, the hypothesis that resists disproof in this Darwinian selection among "multiple working hypotheses," has a much better chance of being the right answer than if you had simply run with the first idea that caught your fancy.*

• Try not to get overly attached to a hypothesis just because it's yours. It's only a way station in the pursuit of knowledge. Ask yourself why you like the idea. Compare it fairly with the alternatives. See if you can find reasons for rejecting it. If you don't, others will.

• Quantify. If whatever it is you're explaining has some measure, some numerical quantity attached to it, you'll be much better able to discriminate among competing hypotheses. What is vague and qualitative is open to many explanations. Of course there are truths to be sought in the many qualitative issues we are obliged to confront, but finding them is more challenging.

• If there's a chain of argument, every link in the chain must work (including the premise)—not just most of them.

• Occam's Razor. This convenient rule-of-thumb urges us when faced with two hypotheses that explain the data equally well to choose the simpler.

• Always ask whether the hypothesis can be, at least in principle, falsified. Propositions that are untestable, unfalsifiable are not worth much. You must be able to check assertions out. Inveterate skeptics must be given the chance to follow your reasoning, to duplicate your experiments and see if they get the same result.

(Excerpts from: The Demon-Haunted World)
The Merchants of Panaceas - I

Narendra Nayak

If you have discovered a new drug for headache and want to market it - well wait a minute (sorry the wait could be for a few years), your concoction will have to go through animal toxicity studies, proof of effectiveness, various phases of clinical trials, teratogenic experiments etc which could take anything up to five years to be marketed. But, you could give it an appropriate sounding name, say that the composition came from a traditional text and you could market that without any of the above formalities! If that is the case then the Drugs and Cosmetics Act, The Drugs and Magical Remedies (objectionable) Advertisements Act or in fact any other law of the land would not be applicable to you. If it were to be called an ayurvedic remedy then that pharmacopia would be applicable, if it were to be called homeopathic then those standards would be applicable. But, the safest way would be to link to some religious rites, adorn one self in the appropriate robes and start invoking the names of deities of the appropriate religion!

If you think this is hype, switch on your TV and switch on one of the channels going by the names of god, religion, devotion, faith or any such and you will be enlightened by people wearing robes of various colors( depending on the religion which they claim to promote). One such character is Ramdev, who has appropriated titles like guruji, gurumaharajji etc. He claims to have found cures for everything starting from the common cold to cancer, dandruff to AIDS. Sitting on a raised platform and supposedly conducting yoga camps and promoting exercises for health, he enlightens his audiences with pearls of his fathomless wisdom and keeps saying that his objective is health for all. The question is- Is it health for all or wealth for him?

Well, the answer seems to be the latter. He goes on the stage and starts flaunting his flat stomach and starts huffing and puffing like one of those old time steam engines and these episodes of breathing are interspersed with interviews with patients, diagnosis and advice on treatment. There are phone calls from all over with advice being sought for various diseases the names of which he has difficulty in pronouncing- for example he says tirigymingal neuralagia for trigeminal neuralgia. Though he has problems pronouncing the words- he has no such when it comes to treatment. He has treatment for every illness- the first would be to practice pranayama and then would follow his unique diet and treatment. He would also order the patient to go to the nearest what he calls as his advisory center and collect medicines from there. Despite his claims to the contrary what he runs is a clever racket of selling his useless concoctions, amassing wealth in the name of yoga and
a racket involving millions of public money.

The modus operandi of this clever trickster involves a number of clever (or rather crooked) marketing techniques, manipulation of the media and stage managed 'cures'. In Uttaranchal in a place called Pithoragarh, I had been invited for tea to the residence of a professor of philosophy at a local college. When I started speaking to his wife, she asked me what I had to say about Ramdev. I replied that she would better answer that as she had tried his treatment for hypertension and since it did not work out had started on the medication prescribed by her doctor. She was totally shocked and asked me how I found out that. I told her that I had better yogic powers than her guru. She corrected me and said her ex guru! This lady had been enamored by the TV campaigns of this man who had been exhorting people to throw away their tablets and injections. She had stopped taking treatment for her hypertension and started on pranayama as advised by her TV guruji. Within a few weeks her blood pressure shot up and she had to go back to her physician who soundly reprimanded her for stopping the treatment. She had to be given higher dosages of medicines for the situation to be brought under control. In last October in a place called Hazaribagh in Jharkhand the local reporter of the Times of India had a question for me. It was that whether cancer could be cured by Ramdev’s yoga? When I said it was not possible, he told me about his relative who had cancer. The oncologists had diagnosed cancer of the colon at an advanced stage and had informed her that she could live for a couple of years with the treatment. After seeing the TV programs she had decided to go in for Ramdev’s yoga as it promised a full cure. Within a month she was fully cured of all diseases- yes you have guessed it - she had discarded her old body and breathed her last. Yet another instance was in the Delhi University in department of science communication. There was a seminar about communication of scientific temper for the students and the faculty. A very senior professor in the department of physics asked me whether yoga can cure asthma. I replied that it could help to decrease the severity of the attacks. He told me that by the practices of Ramdev’s yoga, he was cured of asthma. I replied as to what conclusion could be drawn from that and he said that all asthmatics should be told to follow Ramdev’s techniques. At that I informed him that I too had been suffering from asthma and after I started swimming about 17 years ago, I did not have a single attack and hence all asthmatics should be advised to take to swimming! He was very angry at that and told me how I could say that. I told him that the same subjectivity was applicable to both our statements!

It is not that Ramdev restricts himself to physical exercises and advice. He considers himself an authority on Ayurveda and prescribes his own concoctions for a variety of ailments. Though he shouts from the rooftops about the exploitation by the multinationals he charges exorbitant rates for his preparations none of which have any records of safety or efficacy. To ward off any litigation that may arise, he forces the patients to sign an undertaking that they are very well aware that his preparations have no approval and are taking them at their own risk! Would any one buy a tablet for a headache from a pharmacy if such an undertaking is asked for? A couple of years ago when there was an uproar about the methods of manufacture of his medication, enquiries were done and some of the samples were tested and found to contain human DNA. He was
prescribing medication containing bones from human skulls for some calcium deficiencies. When questioned he said that in medicines anything was ok! When he went to England we tried to raise some questions about these by the rationalists in Britain. But, it appeared that the question and answer sessions were all stage managed with his actors. Many a time the TV sessions confirm the impression. Never does he admit that any disease is incurable. There are only success stories with patients having been given only days to live by modern scientific medicine having lived for years after doing his yoga. All testimonies are supposedly accompanied by reports which he himself reads and interprets. Every TV session presented by him has instances of diabetics throwing away their insulin and coming back to normal blood sugar levels after following his yoga and pranayama, cancer patients with their tumors melting away etc ad nauseum. Along with the descriptions of the patients there are choicest sarcasms directed at modern systems of medicine, the medical profession and the drug industry.

Ramdev has a good amount of advice for the modern science. He comes to pre conceived conclusions and adds that it is for the scientists to find evidence to confirm them. For example he says that in the time of Mahabharatha there were people who were twelve feet tall and now that the mankind as such is becoming shorter and shorter. He also claimed that Yoga will discover a cure for AIDS within a couple of years. When challenged to prove that claim, which could be very dangerous as people who believed him could engage in unprotected sex with the hope that he would cure them, he beat a hasty retreat and claimed that he had been misquoted! His clarification was that he had actually said that he was expecting science to find a cure involving yoga for AIDS. With a person like him one has to expect that! His hypocrisy is not limited to such. When confronted with really serious cases, he advises them to go ahead with the prescribed treatment and also take the concoctions recommended by him. If the patient gets well he can always claim the credit while failures could be always blamed on the defects of the other medicine! He is also very clever in advertising his unproved remedies. It is always recommended by the members of the audience who claim the healing powers of his preparations. While he does not advice the diabetic to throw away his insulin, it is the so called diabetic from the audience who makes such a claim. That way Ramdev can keep away from any possible litigation.

His hypocrisy is not limited to these. While he gets millions from the various govt. agencies to develop universities etc. he also claims that he does free service. Actually, those who attend his so called camps have to cough up sizeable donations. The ones who have donated more get closer seats and more space. The lesser mortals have to manage with cramped spaces and farther distances from the proclaimer of egalitarian values!

While advice and treatment are given to all and sundry when one looks at Ramdev one is reminded of the old English adage- physician heal thyself. Because, he has a drooping eyelid and facial tic which all his yogic antics do not seem to heal! So much for the promoter of healing powers of yoga.

Proof of god!
1. A plane crashed killing 143 passengers and crew.
2. But one child survived with only third-degree burns.
3. Therefore, God exists.
**MAKARA JYOTHI - a state sponsored fraud**

T.V. Manoj

Come December, a section of the people in South India goes crazy. The men (generally from the middle and lower middle class) who, during the other parts of the year, use the latest shaving gadgets, creams, and assorted liquids to have an “axe-effect” suddenly start roaming around with a fungus face. Some others (generally from the working class) toss away their footwear and strut around barefoot, unmindful of the health hazards involved. They strip themselves out of their colorful clothes – because anything other than black suddenly becomes anathema to them. Welcome to the Sabarimala season.

This crazy behavior reaches its peak just before January 14. It is on that evening – between 6.14 pm and 6.40 pm, to be more precise – that the Government of Kerala, with their eyes on the revenue brought by the devotees from outside the state, perpetrates a massive spiritual fraud - Makara Jyothi - upon the public, every year.

**What the devotees believe**

It is believed by the devotees that the Makara Jyothi appears miraculously at Ponnambalamedu (believed to be the abode of Swami Ayyappan, the presiding deity of the Sabarimala temple) and is the celestial manifestation of the god Ayyappan himself. Some others believe that the Jyothi is an arathi performed by the rishis and devas residing in the hills. The temple authority also takes great care to spread stories that the Ponnambalamedu is inaccessible to human beings and if anybody tries to reach there, he/she will have a miserable end.

Concocted stories about spontaneous curing of incurable diseases or of blind persons who regained their eyesight after witnessing this Jyothi etc are planted in the media. The media, with a very few exceptions, trumpet these stories without bothering to investigate what is happening behind the meticulous appearance of the Jyothi, year after year. The credulous devotees who fall for anything if it comes with a religious tag flock to the temple to witness this miracle.

**What actually happens**

The skeptics and rationalists have always challenged these cock-and-bull stories and had on numerous occasions exposed the fraudulent drama enacted by the temple authorities with the covert help extended by various departments of the Government of Kerala. The most successful attempt at exposing this fraud was made in the year 1981, when a bus-ful of skeptics landed with fire crackers and cameras in hand, on the evening of January 14, at Ponnambalamedu, the very spot where this drama was enacted. I quote from an article in Wikipedia, the free online encyclopedia, to give a glimpse into what had happened on 14 January 1981.

“Ponnambalamedu is a flat grass-land spotted with a few trees. About half-a-kilometer away from there was stationed a Jeep (Registration Number: KRV 989) belonging to Travancore Devaswam Board. A crowd of about 500 persons including women and children
(mostly relatives and friends of employees of Kerala State Electricity Board, who manages the nearby Sabarigiri Hydroelectric Project) had come to the site to witness the lighting of the Makara Jyothi.

At about 6.30 PM, V.R.Gopinathan Nair, the driver with the Kerala Electricity Board, and his accomplices filled a vessel with camphor. At about 6.40 PM, when they received a signal (a flashlight), from Sabarimala Gopinathan Nair lit the camphor and raised it thrice facing Sabarimala. Interestingly, the rationalists who assembled there also lighted some crude torches and firecrackers.

The radio commentators and reporters of newspapers, clueless about the presence of rationalists/debunkers and their tactics, faithfully reproduced what they saw.

- "There it raises the Makrajyothi: first as a lightning, then as a lamp or star and now as a camphor light!...there it raises, disappears, and then appears again!" (Translation of a live Malayalam Commentary on Akashavani, 14 January 1981)
- "Makara Jyothis appeared, not once but many times" (Mathrubhumi, 15 January 1981)
- "Next to Jyothis, there also appeared a number of small lights" (Deepika, daily, 15 January 1981).

These reports about repeated and multiple appearance of Makarajyothi (as against the divine number three) on that day undoubtedly refer to the torches and crackers lit by none other than the debunkers.

Enraged by the exposure, the temple authorities instigated the officials of the Road Transport Office who then lodged a case against the owner of the bus used by the activists to reach Ponnambalamedu. (As no case could be registered against the rationalist activists, the bus owner was later fined with 1000 rupees for plying the bus in an unauthorised route without the prior permission of the Road Transport Office). From the next year onwards, this fraud is being perpetrated under the protection provided by the state police”.

The NDTV expose

Last year, in February 2007, Rajesh Ramachandran, a correspondent of the NDTV filed a report from Ponnambalamedu - a first ever expose by a national TV channel. The correspondent took the viewers through the jungle to the very spot where the miraculous jyothi is lit every year. The video clippings accompanying the report show the police barricade guarding the road leading to Ponnambalamedu. The place now has a neat concrete slab to perform the puja prior to the lighting of the divine miracle.

The website of the NDTV still hosts the clippings from the telecast along with the text of the commentary. Here is the address of the website:

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Phone: (080) 26696553, 26691927

Special Public Meeting – 7

Subject: Changing Trends in Media
Speaker: Iswar Daitota
Editor, The Times of India (Kannada)

Date: 27 January 2008, Sunday, at 4.30 PM

Venue: B.M. Shri Smaraka Prathishtana
B.M. Shri Kala Bhavan, 3rd Main Road,
N.R. Colony, Bangalore-9

The meeting will be presided by A.S. Nataraj, author and
president of the Association